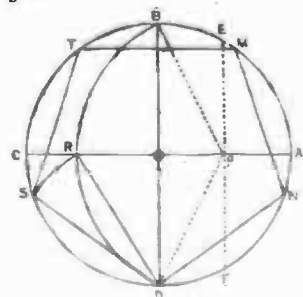


been formed according to the method here given, any other conditions can readily be complied with; but the present construction inscribes the figure in a given circle.

CONSTRUCTION.—Describe the circle ABCD of any convenient size at pleasure, the diameters AC, BD being at right angles to each other. With the same radius or extent of the compasses, set off AE and AF in both directions, making the arc EAF equal to 120 degrees: draw the chord EF intersecting the diameter AC in P the centre of construction for the pentagon.



About P as a centre, with the distance PB or PD as a radius, describe the circular arc BRD, intersecting the diameter AC in the point R: draw DR, and about D as a centre with DR as a radius, describe the small circular arc RS to meet the circumference of the circle in the point S, and draw DS; then is DS the side of the pentagon required, which being set five times round the circumference of the circle, will mark out the polygonal figure or pentagon DSTMN.

This is a very simple and elegant method of describing a pentagon or five-sided figure; but it may be proper to remark, that it determines the side of a regular decagon or ten-sided figure at the same time; for the central distance OR, is the side of a decagon.

The method of construction here given is very well known to mathematicians, having been suggested by Ptolemy in the first book of his "Great Construction;" it is not however, so well known among practical men, and it is for this reason that we have thought it might be useful to bring it under their notice.

PRACTICAL CALCULATION OF THE PENTAGON.

From the simple nature of the preceding construction, we readily perceive that the side of a pentagon inscribed in a circle of given dimensions, admits of a ready numerical determination, from which its practical delineation is immediately obtained by scale and compasses: thus, by a simple calculation, we find the side of the inscribed pentagon to be

$s = \frac{r}{2} \sqrt{10 - 2\sqrt{5}} = 1.1756r$, in which expression the symbol r indicates the radius of the circle, and s the side of the inscribed pentagon.

This is a very simple expression for the side of a pentagon, and very easily put into practice; but the following rule in words will render the subject more generally intelligible to practical men.

RULE.—Multiply the radius of the circle by the constant 1.1756, and the product will be the side of the pentagon, in the same measure as the radius of the circle.

EXAMPLE.—A gentleman has a piece of ground of a circular form, 22 feet in diameter, on which ground he wishes to build a summer house in the form of a regular pentagon: what will be the length of the side outwardly?

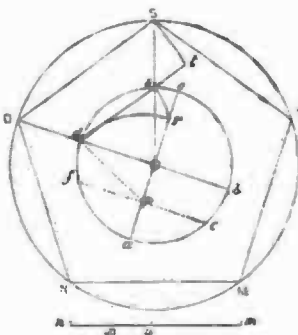
Here the plot of ground is 22 feet in diameter, and consequently its radius is 11 feet; hence, by the rule, we have $1.1756 \times 11 = 12.9316$ feet, the length of the side required exteriorly, and this known, the length of the side interiorly, which depends upon the thickness of the wall, is easily determined.

PROBLEM 2.—To describe practically a regular pentagon, or five-sided figure, the side of which shall be of any proposed length.

The practical construction of this problem

pre-supposes that of the foregoing; but since that is a matter of great simplicity, the labour of the solution is but little enhanced by it; in order, therefore, to render the solution complete, we shall endeavour to combine the two operations in one as follows:—

Describe the circle $abcd$ of any convenient size at pleasure, and find ds the side of a pentagon as in the foregoing problem, which side thus found may be either greater or less than the given side. Take the difference between ds , the side of the pentagon found by the construction, and mn , the given side; then, if mn be greater than ds , set off mu equal to ds , and bisect the remainder nu in the point x ; produce ds , the side of the first constructed pentagon, till st be equal to nx , and erect the perpendicular tS , meeting the production of the radius OS in S ; then, through the point S , draw SD parallel to sd , to meet Od produced in D , and SD will be the side of the pentagon required.



Therefore, with the radius Od or OS describe the circle DNMTSD, and on the circumference thereof set off DS five times and join the adjacent points, which will form the pentagon required. If the side of the constructed figure should happen to be greater than that of the figure required, take the less from the greater and bisect the remainder; then, set half the remainder from d towards s , or from s towards d , and draw a perpendicular to meet OS or Od , and construct the figure as before.

The following, however, is a still readier way of determining the radius of the circle by calculation, and when the radius of the containing circle and the side of the pentagon are given, the figure itself is easily constructed.

RULE.—Multiply the given side of the pentagon by the constant fraction 0.95063 , and the product will be the radius of the circumscribing circle: round the circumference of which set the given side five times, and the pentagon will be completed.

EXAMPLE.—What will be the radius of a circle capable of containing a regular pentagon whose side is 20 feet in length?

In the constant multiplier above given, the three right-hand figures are of very little value, and may be omitted in all practical cases, the first two places '95 being quite sufficient.

Here, by the rule, we have $0.95 \times 20 = 19$ feet, the radius of the circle required.

ST. MARGARET'S, AT CLIFFE, DOVER.—Sir: There is an interesting old Norman church at St. Margaret's, at Cliffe, a village about four miles east of Dover. The eastern (?) doorway (a good specimen) was whitewashed a very few years since, and many of the ornaments (some of which are very curious) on the lozenges are nearly illegible from that cause. The double-toothed ornament is very curious, as is likewise the moulding nearest the door opening. The interior of the church has also been whitewashed, and many of the arch and other mouldings have been greatly damaged from this most absurd practice. The northern doorway has been preserved from whitewash, and is a much older and finer specimen than the eastern. Some of the ornaments are very curious (for instance, four or five death's heads on the eastern side). I do not know of any published illustrations of this old church, or of any of its parts.—T. A. B.

NOTES IN THE PROVINCES.

Norwich.—The church of St. Matthew, at Thorpe hamlet, designed, according to local papers, by Messrs. Brown and Kerr, was consecrated on Friday week. It is in the Early Norman style, and cruciform, with nave and transepts, but without tower or aisles. There is a semicircular finished apse for the chancel. The walls are built of Kentish rag-stone, with white brick dressings. In the decorations for the doors and windows the old English style of moulded bricks has been revived. There is a circular stone bellry at the west end, supported by corbeling on each end of the wall. The dimensions of the building are—extreme length, 79 feet; width, 24 feet; length of transepts from north to south, 61 feet; and width of transepts, 25 feet: the extreme height, from the door to the roof, is 29 feet. The roof is of deal, stained in oak, and the fittings and furniture are of same material. The cost of the building has been 2,300*l.*, and a further sum of 1,000*l.* was raised for the endowment. Mr. Wurmum was the contractor.

Framingham Pigot.—The church in this parish, says the *Norfolk Chronicle*, has of late undergone restoration at the expense of Mr. Plumer and Mr. Christie. The old bellry, which endangered the west wall of the edifice, has been removed, and a new bell turret has been erected at the angle of the wall, in a more secure position. It is a light open bell turret, with a new buttress. Mr. Kerr, architect, supplied the design.

Pickwell (Melton Mowbray).—With reference to some remarks lately quoted in our columns from a provincial paper, on the design of the chancel of the church here, lately repaired, a local correspondent remarks that as the chancel itself is not new, any reflection on the design of it is misplaced so far as recent works are concerned. These works were done with a sum of 175*l.*, recovered from the executors of a late incumbent who had allowed the chancel to become dilapidated. Our correspondent very properly remarks that "misleading the public, and inflicting injury upon tradesmen, by communicating to a newspaper upon such guess work information as that of the correspondent of the newspaper, mentioned, statements professing to be facts, but in reality false, is a practice which can neither be too strongly condemned, nor too rigorously exposed."

Salisbury.—The subscribers to the fund for the erection of a church and schools at Saltney, have resolved that a school to accommodate about 140 children be commenced forthwith, and that one-third of the funds already subscribed be devoted to this purpose. Mr. James Harrison was appointed architect. The Shrewsbury and Chester Railway Company have offered to convey the building materials along their line free of charge.

Knaresley, Baddulph.—A new church in the village of Knaresley, in the parish of Biddulph, Staffordshire, was opened on the 27th ultimo. It has been built at the cost of Mr. Bateman, and is in the Early Decorated style, with nave and transept, chancel, and tower with octagonal spire. The east window is of four lights, with tracery; the west of five lights, also with tracery. The chancel roof is of oak, and open to the rafters. The platform round the communion table is paved with black and grey marble, supplied by Messrs. Hall and Co., of Derby. The remainder of the paving in the chancel, and the whole of that in the nave is formed of flags of Hopson Wood stone, bordered with black tiles from Messrs. Minton and Co.'s. The building will be warmed by apparatus supplied by Messrs. Haden, of Frowbridge. Near the church is a parsonage in the Elizabethan style. There are also schools, with master's dwelling, and village library and reading-room.

Nottingham.—An ornamental fountain, from a design by Mr. Papworth, architect, is proposed to be erected in the market-place at Nottingham. The gas company are forming two new gas tanks of very large dimensions. They will each be 120 feet across on the outside, and 93 feet, when finished, in the inside. On the outside they will be 24 feet below the